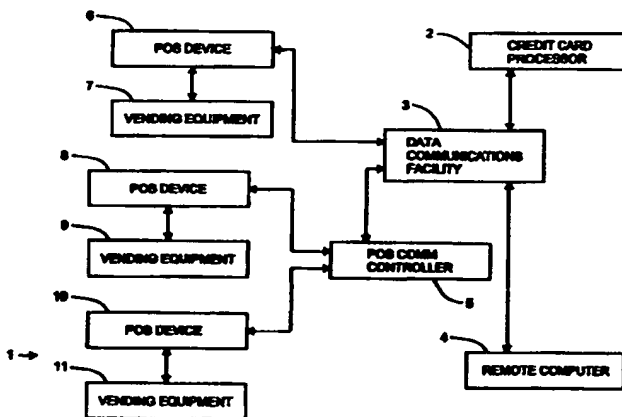




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(54) Title: POINT OF SALE SYSTEM FOR PROCESSING STATISTICS AND DIAGNOSTICS AND METHOD OF OPERATING SAME



## (57) Abstract

A point-of-sale (POS) system and method for gathering, processing and reporting statistics of unattended vending equipment is provided. The method includes: connecting a vending machine to a POS device; connecting a remote device to the POS device to process statistical or diagnostic data concerning the vending machine; detecting an operational status parameter of the vending machine; storing the parameter; and transmitting the parameter to the remote device via the POS device. The system includes a vending machine; a POS device (6) connected to the vending machine (7); a remote processor (4) connected to the POS device; wherein the POS device further comprises: a communications processor; a router connected to the communications processor; a card processor connected to the communications processor; a POS statistical processor connected to the router; and a POS-to-vending communications processor connected to the router, the card processor and the vending machine.

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POINT OF SALE SYSTEM FOR PROCESSING STATISTICS  
AND DIAGNOSTICS AND METHOD OF OPERATING SAME

5

BACKGROUND OF THE INVENTION

10           The present invention relates generally to point-of-sale (POS) credit and debit networks and in particular to a system and method for processing statistics and diagnostics when POS devices are installed in conjunction with vending devices or other unattended equipment.

15           Point-of-sale (POS) devices are available for processing credit cards, debit cards or other financial transactions from a vending machine for processing by a host computer. These vending machines pass sale information to the credit card device; then the credit card device transmits the information to a financial-processing host computer. The POS device is a data communication device that is programmed to communicate in a proper format  
20           for processing financial information. Most point of sale devices have a processor, an internal modem, a credit card reader, a keypad and a display. When used with vending machines, the keypad and display are not usually required. The modem is always required for purposes of this discussion.

25           Vending machines are becoming more processor-driven as microprocessors and electronic components are more readily available. This added capability allows for more communications and data gathering than previously considered. However, vending machines, which are unattended for

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the most part, are susceptible to maintenance issues and supply and inventory reporting problems.

5 A need has arisen to gather and process more information about the vending machine and its status and to use the POS device for this purpose. A beneficial result of such a system is cost savings due to a reduction of personnel needed to physically travel to and check on the vending machines. Such a system could also increase revenues by ensuring that the vending equipment is operational and fully stocked. A need to "eavesdrop" (or determine the machine's activities) electronically from a remote site has also arisen.

## BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide a means for vending operators to gain access to or to obtain a report of vending operations by using a POS device attached to a vending machine.

5 Another object of the invention is to provide an economic advantage for operating vending machines by providing notification of supply shortages in the machines or malfunctioning equipment components in the machines.

Yet another object of the invention is to advantageously use inherent POS device capabilities and electronics to provide reporting from the vending machines, thereby eliminating or reducing the cost of providing separate communications capabilities.

The present invention provides the capability for vending machine operators to access statistics and diagnostic information regarding the operation of remotely located and unattended vending machines. To this end, the vending machine provides information, or access to information, to a connected POS device. This POS device then stores the information for subsequent transmission to a remote computer for processing. Alternatively, the POS device, when instructed, can immediately transmit the information to a remote computer for processing. The present invention also takes advantage of the existing POS device's transmission and processing capabilities so that information may be acceded without visiting the vending machine at the remote site.

An example of a method for accessing the information uses a remote computer to dial the POS device via switched public-domain telephone networks and to instruct the POS device to connect the remote computer to the vending information or the vending machine for gathering information. Another example of a method for accessing information uses the vending machine to instruct the POS device to place a call using the public domain telephone networks to a remote computer in order to send information to the computer.

30 To achieve the objects of the present invention, a system for monitoring and interrogating a vending machine is provided. The system comprises a

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vending machine, a point-of-sale (POS) device connected to the vending machine and a remote processor connected to the POS device via a data communications facility. The POS device further comprises: a communications processor connected to the data communications facility; a router connected to the communications processor; a card processor connected to the communications processor; a POS statistical processor connected to the router; and a POS-to-vending communications processor connected to the router, the card processor and to the vending machine.

In an embodiment, the system further comprises a vending-to-POS communications processor connected to the POS-to-vending communications processor of the POS device; a vending logic control processor connected to the vending-to-POS communications processor; and a vending statistics and diagnostics processor connected to the vending-to-POS communications processor and to the vending logic control processor.

In an embodiment a request processor; an outboard response processor connected to the request processor; a vending test and reporting processor connected to the request processor; and a statistics and error register connected to the outbound response processor and to the vending test and reporting processor.

In an embodiment a vend logic controller connected to the vending test and reporting processor of the vending statistics and diagnostics processor; and means for detecting a malfunction of the vending machine connected to the vend logic controller.

In another embodiment the present invention provides a system for monitoring unattended remote vending equipment. The system comprises a point of sale (POS) device connected to the vending machine; a remote device connected to the POS device to process statistical or diagnostic data concerning the vending machine; means for detecting an operational status parameter of the vending machine; means for storing the parameter; and means for transmitting the parameter to the remote device via the POS device.

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In an embodiment, the system further comprises means of re-instructing the vending device to transmit a report via the POS device to the remote device.

In an embodiment, the system further comprises means for obtaining on-line parameters from the vending machine.

5 In an embodiment, the system further comprises means for providing bi-directional communication between the remote device and the vending machine.

In an embodiment, the system further comprises means for providing means for providing bi-directional communication between the remote device and the vending machine via the POS device.

10 In addition, the present invention also provides a method for processing and reporting diagnostics and statistics of a vending machine to a remote cite. A method comprises the steps of connecting a vending machine to a point-of-sale (POS) device; connecting a remote device to the POS device to process statistical or diagnostic data concerning the vending machine; detecting an  
15 operational status parameter of the vending machine; storing the parameter in a storage means; and transmitting the parameter to the remote device via the POS device.

In an embodiment, the method further provides the step of detecting a vending statistic of the vending machine.

20 In an embodiment, the method further provides the step of detecting a vending diagnostic parameter of the vending machine.

In an embodiment, the method further provides the step of detecting an error in the operation of the vending machine.

25 In an embodiment, the method further provides the step of storing the parameter in a register.

In an embodiment, the method further provides the step of displaying the parameter.

In an embodiment, the method further provides the step of initiating a self-diagnosis of the operation of the vending machine.

30 In an embodiment, the method further provides the step of determining an inventory of consumable in the vending machine.

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In an embodiment, the method further provides the step of faxing the parameters via facsimile.

In an embodiment, the method further provides the step of using the remote device to initiate the processing.

5 In an embodiment, the method further provides the step of using the vending machine to initiate the processing to the remote device.

In an embodiment, the method further provides the step of programming the POS device to gather parameters for a set time period.

10 In an embodiment, the method further provides the step of programming the vending machine to gather parameters for a set time period.

In an embodiment, the method further provides the step of automatically collecting predetermined parameters at predetermined time intervals.

In an embodiment, the method further provides the step of connecting the remote device to the POS device locally.

15 Features and advantages of the invention will become apparent from the following specification which, in association with the attached drawing figures and claims, describes the invention. The figures are annotated with consistent reference numerals throughout.



BRIEF DESCRIPTION OF THE  
SEVERAL VIEWS OF THE DRAWING

5       Figure 1 is a block diagram of an embodiment of a system for processing statistics and diagnostics for a vending operation using a POS device of the present invention.

      Figure 2 is a block diagram of an embodiment of the POS device and the vending machine of the present invention in greater detail.

10       Figure 3 is a block diagram of a vending statistics and diagnostic processor and vending logic and control processor detailing involved in gathering and reporting vending machine statistics in the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

Figure 1 is a block diagram of a POS-based system for gathering statistics and diagnostic information from a vending machine and providing a means to retrieve or receive the information utilizing a commercially-available POS device. The present invention is indicated generally by reference numeral 1.

A POS device 6 depicted in Figure 1 is normally connected to a credit card processor 2 via a data communications facility 3 for the purpose of transmitting credit card or debit card transaction information. The POS device 6 receives commercial transaction information from vending equipment 7 and properly formats the data for transmission to the credit card processor 2. The credit card processor 2 communicates the results of the transaction back to the POS device 6 which then completes the transaction.

The data communications facility 3 in Figure 1 can have various embodiments. For example, telephone facilities, satellite facilities, leased line facilities or any other means for communicating between the credit card processor 2 and the POS device 6 can be used.

In addition, the credit card processor 2 may be any transaction processing computer or processor that receives information which can allow for transfer of financial information from a user of the vending equipment 7 to the owner of said equipment resulting from services performed or products delivered from the vending equipment 7. The credit card processor 2 may be used for processing credit cards, debit cards or other financial information. The credit card processor 2 can handle cards using magnetic stripe information, chip card information or any other means at the POS device 6 which identifies the user of the vending equipment 7.

The POS device 6 may communicate to the data communications facility 3 by direct means depicted in Figure 1 as POS device 6. Alternatively, a POS device 8, 10 may communicate through a POS communications controller 5 as shown in Figure 1. The POS communicate through a POS communications controller 5 as shown in Figure 1. The POS communications controller 5

allows multiple POS devices 8, 10 to share one connection to the data communications facility 3. This sharing arrangement reduces costs of using the data communications facility 3 and allows for less expensive equipment to be used as the POS device 8, 10. Many such POS devices may be connected to the POS controller 5 and may be connected via various means, such as a local area network, serial connections or wireless connections. Vending equipment 9, 11 may be connected to these POS devices 8, 10 respectively, to provide for processing financial transactions.

The present invention also includes a remote computer 4 that may connect to the POS devices 6, 8, 10 to collect and/or process statistical or diagnostic data concerning the vending equipment 7, 9, 11. The computer 4 can connect to the POS device 6, 8, 10 in the same manner as the credit card processor 2 by using the data communications facility 3.

The POS device 6 will determine the method of communication as depicted in Figure 2. This is done by a communications processor 61. The communications processor 61 determines, from the data received from the data communication facility 3 or the POS communications controller 5, which type of messaging has been received by the POS device 6.

The POS device communications processor 61 then sends the information to a statistics and diagnostic router 63 which determines if the statistics and/or diagnostics request is for the POS device. When this is true, the request is routed to a POS statistics and diagnostics processor 65 or to a POS-to-vending communications processor 64 for communications to the vending equipment 7.

If the router 63 routes the request to the POS statistics and diagnostics processor 65, then the POS processor 65 performs the processes per normal statistical practices that are common in POS devices and returns the diagnostics results or statistical data from the processor 65 to the router 63 which then sends the data to the POS device communications processor 61. The communications processor 61 formats the data properly so that it is

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communicated to the remote computer 4 via the data communications facility 3 or the POS communications controller 5 and the data communications facility 3.

5 If the statistical or diagnostic request is for the vending equipment, the router 63 will send the request to a POS-to-vending communications processor 64 for transmission to a vending-to-POS communications processor 71 of the vending equipment 7. The vending-to-POS communications processor 71 determines if the data is vending logic and control signals, in which case it will send the data to a vending logic and control processor 72. If the data is a  
10 request for statistical and diagnostic data, the communications processor 71 will route the data to a vending statistical and diagnostic processor 73.

The vending logic and control processor 72 and the vending statistical and diagnostic processor 73 are shown in Figure 3. The statistical and diagnostic processor 73 has a request processor 731 depicted in Figure 3 that  
15 will receive any diagnostic and statistical request. The request processor 731 will determine the nature of the diagnostic or statistical request.

The vending logic and control processor 72 and the vending statistical and diagnostic processor 73 are shown in Figure 3. The statistical and diagnostic processor 73 has a request processor 731 depicted in Figure 3 that  
20 will receive any diagnostic and statistical request. The request processor 731 will determine the nature of the diagnostic or statistical request.

If the request involves retrieving statistical information from statistical and error data base registers 733, then the processor 731 will request an outbound response processor 732 to obtain the data from the data base registers  
25 733 and transmit it back to the POS-to-vending communications processor 64 where it will be transferred to the statistics and diagnostic router 63 for eventual transmission back to the remote computer 4.

If the request involves exercising the vending machine for diagnostic purposes, the request processor 731 will pass the request along to a vending test and reporting processor 734 which will forward the request commands to a  
30 vending machine logic control processor 721.

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The vending machine logic controller 721 has normal vending functions of receiving monetary information from a vending currency processor 722 and controlling the resulting vend operation with a vend delivery mechanism sensing and control processor 723. The vend logic controller 721 also provides  
5 consumer interactive information such as keypad and display information via the interactive processor 724. In addition to these normal functions, the current invention uses the vend logic controller 721 to receive requests for diagnostic exercises and routes them to the vend delivery and mechanism sensing and control processor 723 for actual running of the machine using a vend action  
10 mechanism processor 725. The result of this operation is sensed by a vend sensing circuit 726 and reported back to the vend delivery mechanism sensing and control processor 723 for reporting to the vend logic controller 721. The vend logic controller 721 communicates the information to the vending test and reporting processor 734. The processor 734 posts the results in the error  
15 register 733 and notifies the request processor 731. The request processor 731 instructs the outbound response processor 732 to send the resulting data to the POS device 6 for transmission through the data communications facility 3, to the remote computer 4. The remote computer 4 stores the information in a database format or report directly using a printer or other device attached to the  
20 computer for user notification of the results.

If the vending equipment 7 logically detects a malfunction of the vend action mechanism 725 in the course of operation, the vend delivery mechanism 723 may report an error to the vend logic controller 721 which may post an error on a visible means (not shown) using the interactive processor 724. The  
25 vend logic controller 721 may also be programmed to initiate a self-reporting diagnostic to the vending statistics and diagnostics processor 73. The vend logic controller 721 may also detect errors in any other processes such as the vend currency process 722 and also report those to the vending statistical and diagnostics processor 73.

30 To accomplish the reporting, the vend logic controller 721 reports any malfunction to the vending test and reporting processor 734. The processor 734

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posts the results in the error register 733 and notifies the request processor 731. The request processor 731 instructs the outbound response processor 732 to send the resulting data to the POS device 6 for transmission through the data communication facility 3, or the POS communications controller 5 and the data communications facility 3, to the remote computer 4. The remote computer 4 stores the information in a database format or report directly using a printer or other device attached to the computer for user notification of the results.

It should be understood that various changes and modifications to the presently preferred embodiments described herein will be apparent to those skilled in the art. Such changes and modifications may be made without departing from the spirit and scope of the present invention and without diminishing its attendant advantages. It is, therefore, intended that such changes and modifications be covered by the appended claims.

## CLAIMS:

1           1.     A system of monitoring and interrogating a vending machine,  
2 comprising:

3           a vending machine;

4           a point-of-sale (POS) device connected to the vending machine;

5           a remote processor connected to the POS device via a data  
6 communications facility;

7 wherein the POS device further comprises:

8           a communications processor connected to the data communications  
9 facility;

10          a router connected to the communications processor;

11          a card processor connected to the communications processor;

12          a POS statistical processor connected to the router; and

13          a POS-to-vending communications processor connected to the router, the  
14 card processor and to the vending machine.

1           2.     The system of Claim 1 wherein the vending machine further  
2 comprises:

3           a vending-to-POS communications processor connected to the POS-to-  
4 vending communications processor of the POS device;

5           a vending logic control processor connected to the vending-to-POS  
6 communications processor; and

7           a vending statistics and diagnostics processor connected to the vending-  
8 to-POS communications processor and to the vending logic control processor.

1           3.     The system of Claim 2 wherein the vending statistics and  
2 diagnostics processor further comprises;

3           a request processor;

4           an outboard response processor connected to the request processor;

5           a vending test and reporting processor connected to the request  
6 processor; and

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7           a statistics and error register connected to the outboard response  
8           processor and to the vending test and reporting processor.

1           4.     The system of Claim 2 wherein the vending logic control  
2           processor further comprises:

3                 a vend logic controller connected to the vending test and reporting  
4           processor of the vending statistics and diagnostics processor; and

5                 means for detecting a malfunction of the vending machine connected to  
6           the vend logic controller.

1           5.     A system for monitoring unattended remote vending equipment,  
2           comprising:

3                 a vending machine;

4                 a point-of-sale (POS) device connected to the vending machine;

5                 a remote device connected to the POS device to process statistical or  
6           diagnostic data concerning the vending machine;

7                 means for detecting an operational status parameter of the vending  
8           machine;

9                 means for storing the parameter; and

10                means for transmitting the parameter to the remote device via the POS  
11           device.

1           6.     The system of Claim 5 further comprising:

2                 means for instructing the vending device to transmit a report via the POS  
3           device to the remote device.

1           7.     The system of Claim 5 further comprising:

2                 means for obtaining on-line parameters from the vending machine.



1           8.     The system of Claim 5 further comprising:

2                 means for providing bi-directional communication between the remote  
3 device and the vending machine.

1           9.     The system of Claim 5 further comprising:

2                 means for providing means for providing bi-directional communication  
3 between the remote device and the vending machine via the POS device.

1           10.    A method for processing and reporting diagnostics and statistics  
2 of a vending machine to a remote site, comprising the steps of:

3                 connecting a vending machine to a point-of-sale (POS) device;  
4                 connecting a remote device to the POS device to process statistical or  
5 diagnostic data concerning the vending machine;  
6                 detecting an operational status parameter of the vending machine;  
7                 storing the parameter in a storage means; and  
8                 transmitting the parameter to the remote device via the POS device.

1           11.    The method of Claim 10 further comprising the step of:

2                 detecting a vending statistic of the vending machine.

1           12.    The method of Claim 10 further comprising the step of:

2                 detecting a vending diagnostic parameter of the vending machine.

1           13.    The method of Claim 10 further comprising the step of:

2                 detecting an error in the operation of the vending machine.

1           14.    The method of claim 10 further comprising the step of:

2                 storing the parameter in a register.

1           15.    The method of Claim 10 further comprising the step of:

2                 displaying the parameter.

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1           16.    The method of Claim 10 further comprising the step of:  
2           initiating a self-diagnosis of the operation of the vending machine.

1           17.    The method of Claim 10 further comprising the step of:  
2           determining an inventory of consumables in the vending machine.

1           18.    The method of Claim 10 further comprising the step of:  
2           faxing the parameters via facsimile.

1           19.    The method of Claim 10 further comprising the step of:  
2           using the remote device to initiate the processing.

1           20.    The method of Claim 10 further comprising the step of:  
2           using the vending machine to initiate the processing to the remote  
3           device.

1           21.    The method of Claim 10 further comprising the step of:  
2           programming the POS device to gather parameters for a set time period.

1           22.    The method of Claim 10 further comprising the step of:  
2           programming the vending machine to gather parameters for a set time  
3           period.

1           23.    The method of Claim 10 further comprising the step of:  
2           automatically collecting predetermined parameters at predetermined time  
3           intervals.

1           24.    The method of Claim 10 further comprising the step of:  
2           connecting the remote device to the POS device locally.

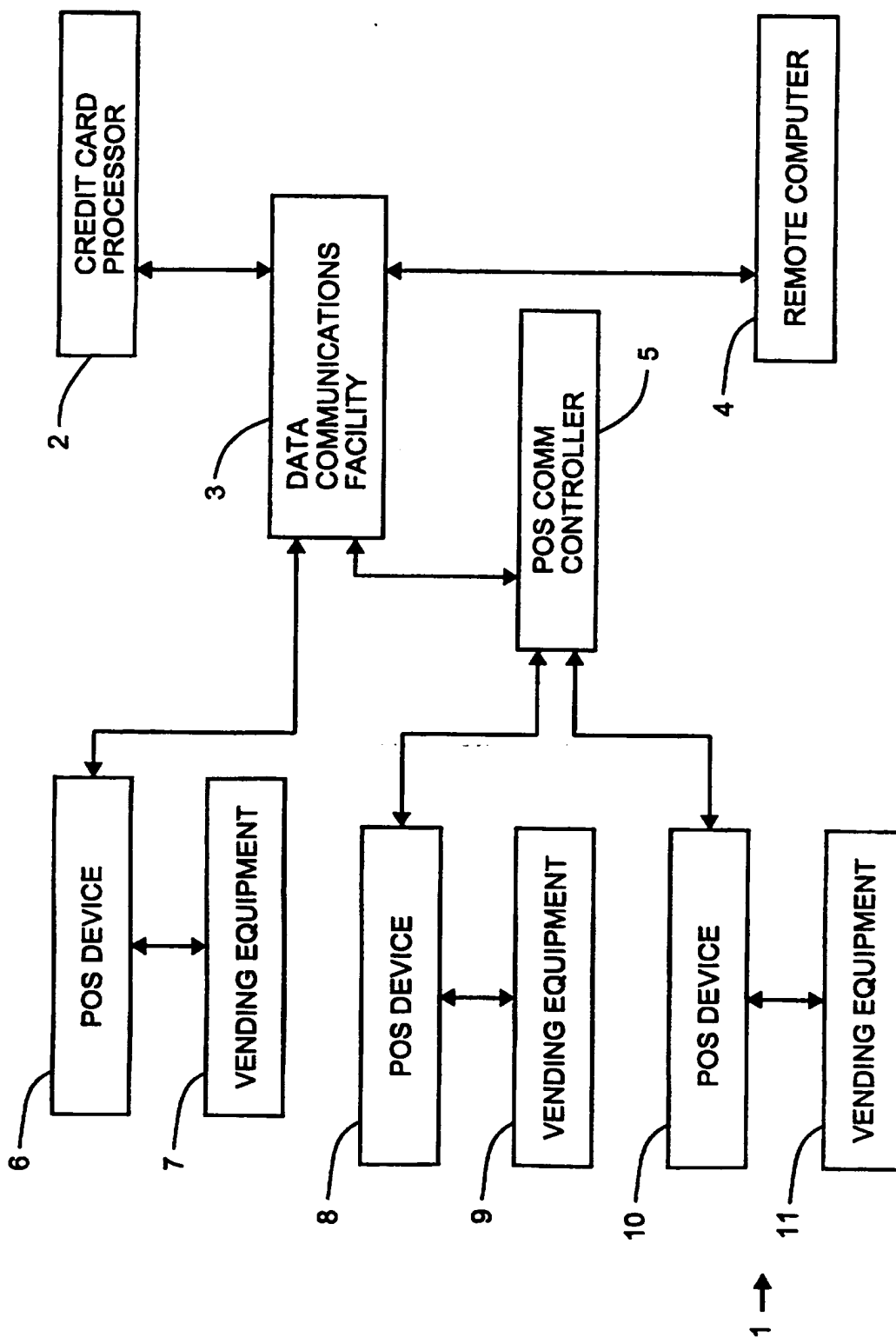


Figure 1

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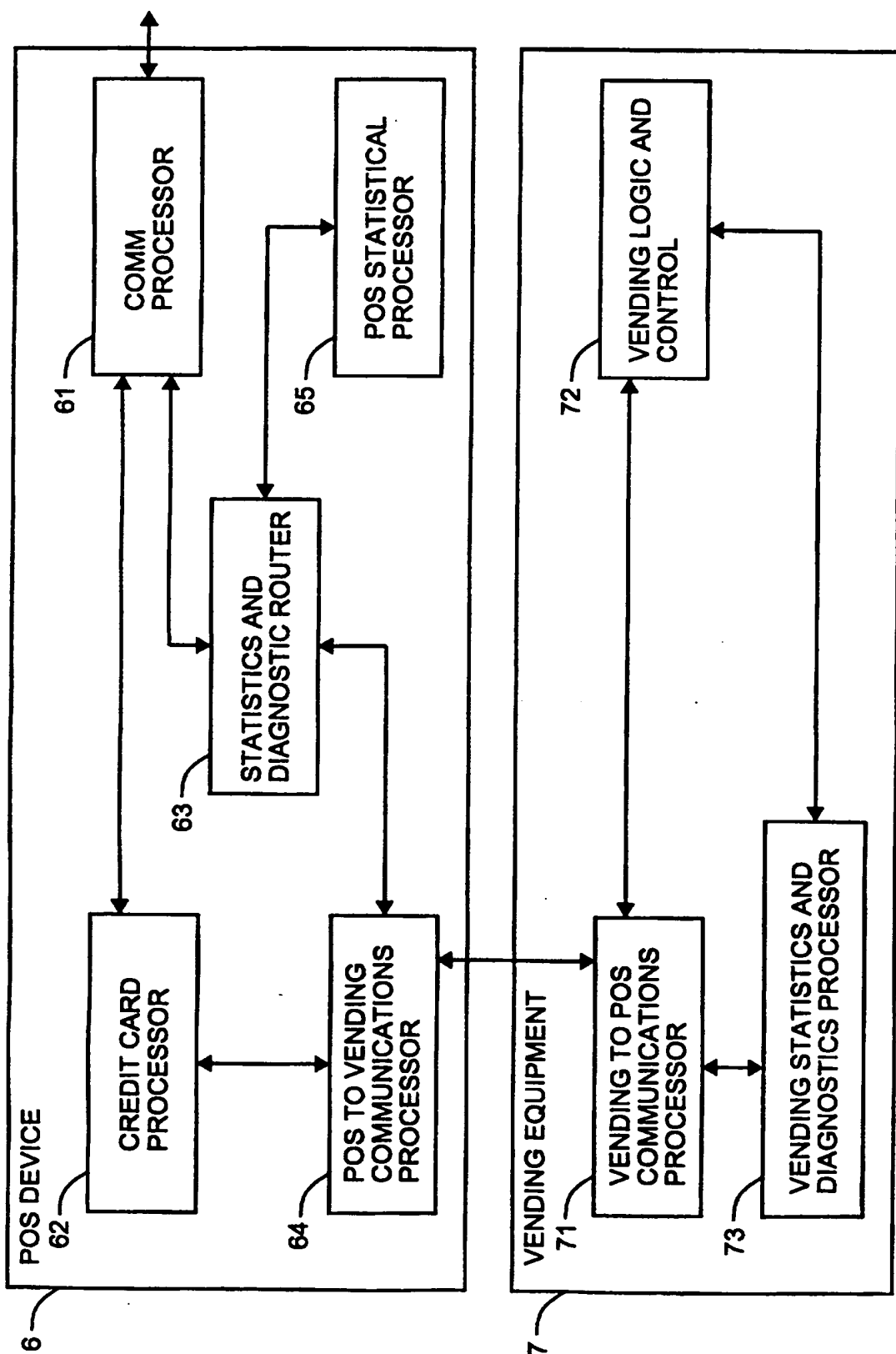


Figure 2

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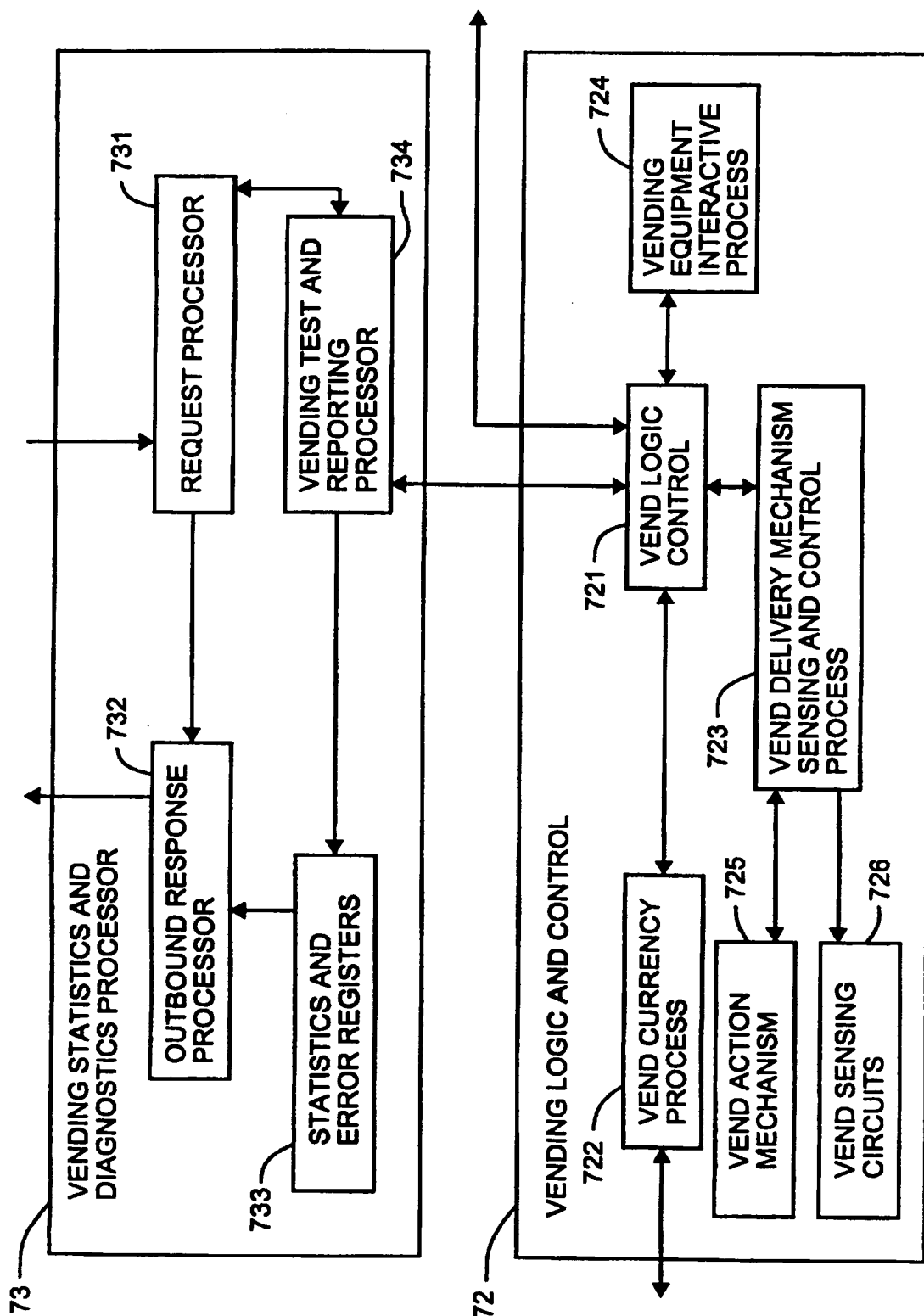


Figure 3

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US97/01709

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) : G06F 17/60

US CL : 395/216; 364/479.06

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 395/216, 217, 221, 222, 228; 364/479.06, 479.11, 479.14; 235/375, 381, 383, 385

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
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NONE**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,445,295 A (BROWN) 29 August 1995, see the abstract, figs. 1-2, 7, col. 6 line 3 to col. 7 line 28.	1-24
Y	US 5,091,713 A (HORNE et al) 25 February 1992, see the abstract, fig. 3.	1-24
A, P	US 5,546,316 A (BUCKLEY et al) 13 August 1996, see the abstract.	1-24
A	US 5,239,480 A (HUEGEL) 24 August 1993, see the abstract.	1-24
A	US 4,970,655 A (WINN et al) 13 November 1990, see the abstract.	1-24
A	US 4,725,977 A (IZUMI et al) 16 February 1988, see the abstract.	1-24

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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